PB-239 599

LAKE WAUSAU, MARATHON COUNTY, WISCONSIN

Pacific Northwest Environmental Research Laboratory

Prepared for:

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Wisconsin National Guard
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November 1974

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16. ABSTRACT
Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
eutrophication lakes nutrients phosphorus nitrogen loading		05B 05C

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REPORT
ON
LAKE WAUSAU
MARATHON COUNTY
WISCONSIN

EPA REGION V

WORKING PAPER No. 55

WITH THE COOPERATION OF THE

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

AND THE

WISCONSIN NATIONAL GUARD

NOVEMBER, 1974

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to fresh water lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the Wisconsin Department of Natural Resources for professional involvement and to the Wisconsin National Guard for conduct of the tributary sampling phase of the Survey.

Francis H. Schraufnagel, Acting Assistant Director, and Joseph R. Ball of the Bureau of Water Quality, and Donald R. Winter, Lake Rehabilitation Program, provided invaluable lake documentation and counsel during the Survey. Central Office and District Office personnel of the Department of Natural Resources reviewed the preliminary reports and provided critiques most useful in the preparation of this Working Paper series.

Major General James J. Lison, Jr., the Adjutant General of Wisconsin, and Project Officer CW-4 Donald D. Erickson, who directed the volunteer efforts of the Wisconsin National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

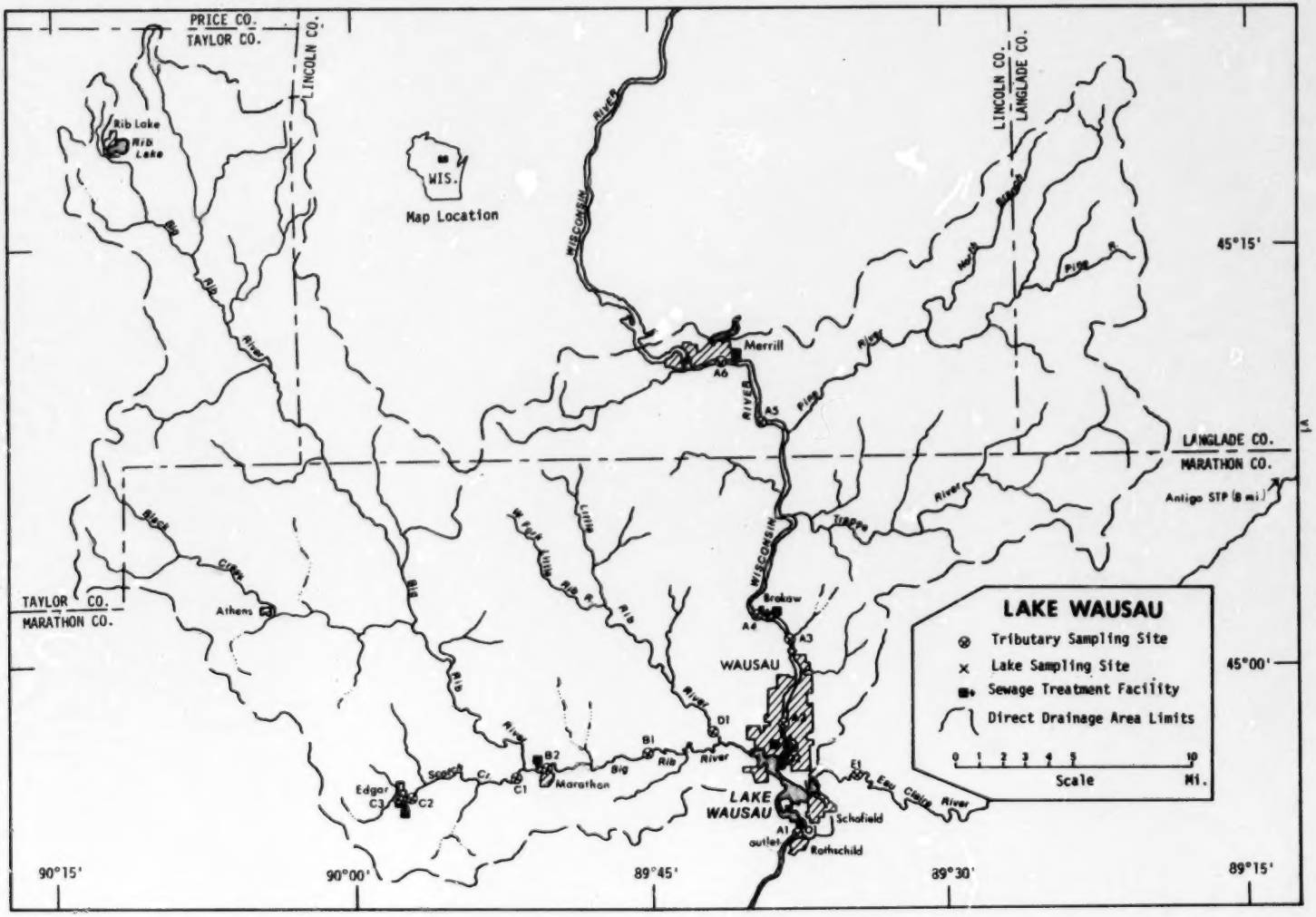
NATIONAL EUTROPHICATION SURVEY

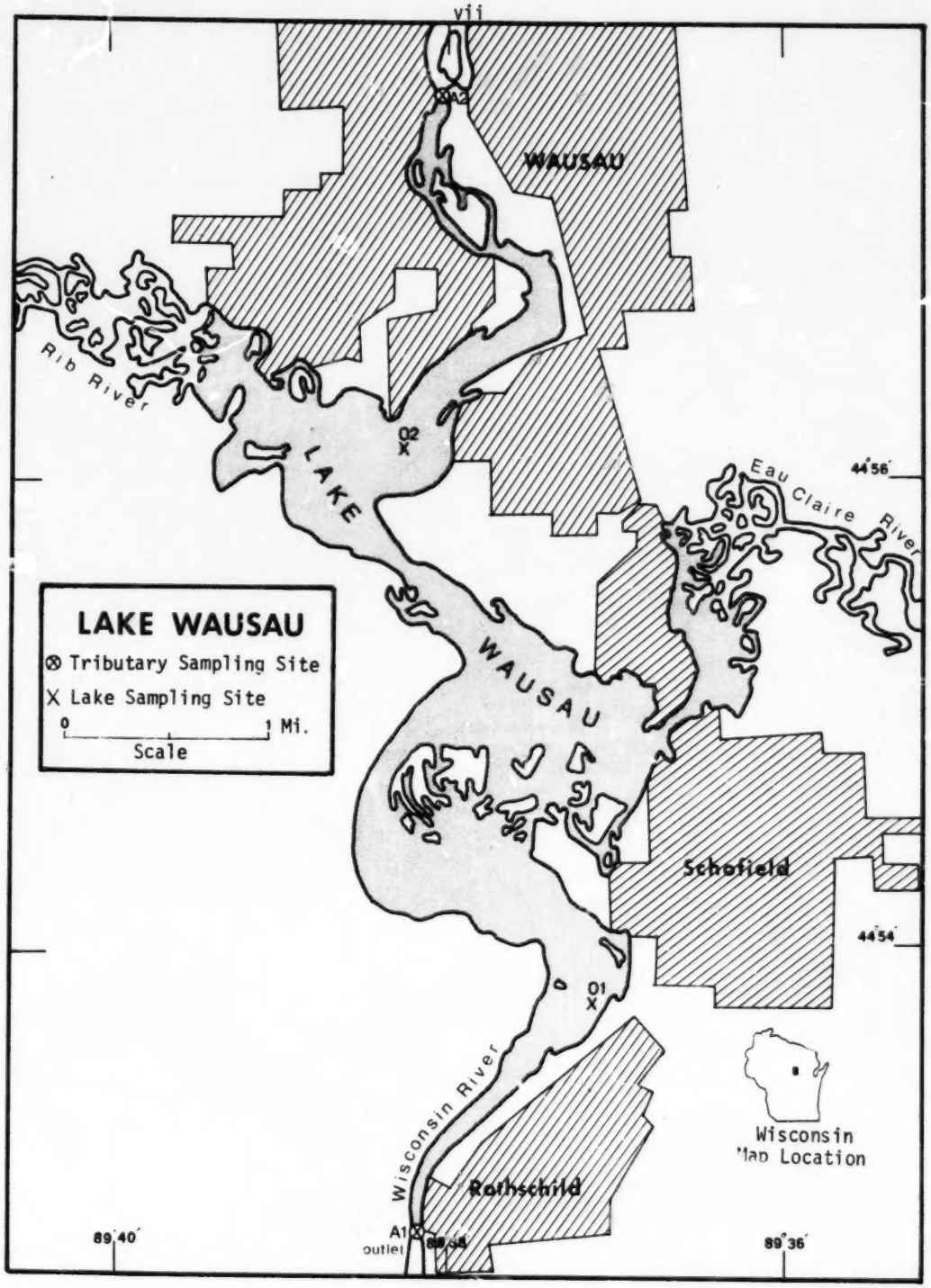
STUDY LAKES

STATE OF WISCONSIN

LAKE NAME	COUNTY
Altoona	Eau Claire
Beaver Dam	Barron
Beaver Dam	Dodge
Big Eau Pleine	Marathon
Browns	Racine
Butte des Morts	Winnebago
Butternut	Price, Ashland
Castle Rock Flowage	Juneau
Como	Walworth
Crystal	Vilas
Delavan	Walworth
Eau Claire	Eau Claire
Geneva	Walworth
Grand	Green Lake
Green	Green Lake
Kegonsa	Dane
Koshkonong	Jefferson, Rock, Dane
Lac La Belle	Waukesha
Middle	Walworth
Nagawicka	Waukesha
Oconomowoc	Waukesha
Okauchee	Waukesha
Petenwell Flowage	Juneau
Pewaukee	Waukesha
Pigeon	Waupaca
Pine	Waukesha
Poygan	Winnebago, Waushara
Rock	Jefferson
Rome Pond	Jefferson, Waukesha
Round	Waupaca
Shawano	Shawano

LAKE NAME	COUNTY
Sinnissippi	Dodge
Swan	Columbia
Tainter	Dunn
Tichigan	Racine
Townline	Oneida
Trout	Vilas
Wapogassett	Polk
Wausau	Marathon
Willow	Oneida
Winnebago	Winnebago, Fond Du Lac, Calumet
Wisconsin	Columbia
Wissota	Chippewa
Yellow	Burnett


PRICE CO.
TAYLOR CO.
LINCOLN CO.
LINCOLN CO.
LANGLADE CO.
WIS.
Map Location
Rib Lake
Rib Lake
Rib River
WISCONSIN River
Merrill
A6
A5
Pine River
LANGLADE CO.
MARATHON CO.
Antigo STP (8 mi.)
TAYLOR CO.
MARATHON CO.
Athens
Black Creek
Little Rib R.
Brokaw
A4
A3
WAUSAU
D1
A2
B1
B2
Big Rib River
Edgor
C3
C2
C1
Marathon
Spencer Cr.
LAKE WAUSAU
E1
Eau Claire River
Schofield
A1
outlet
Rothschild
45°15'
45°00'
90°15'
90°00'
89°45'
89°30'
89°15'
LAKE WAUSAU
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
Direct Drainage Area Limits
0 1 2 3 4 5 10
Scale Mi.


vii
WAUSAU
Rib River
LAKE
WAUSAU
Eau Claire River
44°56'
LAKE WAUSAU
⊗ Tributary Sampling Site
X Lake Sampling Site
0
1 Mi.
Scale
Schofield
44°54'
Wisconsin River
Wisconsin
Map Location
Rothschild
89°40'
outlet
89°36'

LAKE WAUSAU

STORET NO. 5551

I. CONCLUSIONS

A. Trophic Condition:

Survey data show that Lake Wausau is eutrophic.

B. Rate-Limiting Nutrient:

The algal assay results indicate that phosphorus was limiting at the time the sample was collected in November, 1972. However, the lake data indicate nitrogen limitation at the other sampling times.

C. Nutrient Controllability:

During the sampling year, there was an unexpected loss of both phosphorus and nitrogen from Lake Wausau; i.e., about 39% more phosphorus (308,000 lbs) and 23% more nitrogen (2,150,-000 lbs) were measured leaving the lake at the outlet station (A-1; see map, page vi) than can be accounted for by all measured and estimated inputs.

The cause of this marked nutrient imbalance is not known, but it is unlikely that a nutrient wash-out occurred or that a direct-discharge point-source of that magnitude was overlooked. Also, there is no indication that there was any unusual operation of the Rothschild dam such that flushing could have occurred during the sampling year (Schraufnagel, 1974).

Considering the input phosphorus loads only, it does not appear that phosphorus control at the point sources included in

the Survey would result in a significant improvement of the trophic condition of Lake Wausau. However, the nutrient imbalance noted above points to a need for a more detailed study before an assessment of effect of phosphorus control is made.

II. INTRODUCTION

Lake Wausau is an impoundment of the upper Wisconsin River at the Village of Rothschild. According to the Wisconsin Department of Natural Resources (Anonymous, 1972), Lake Wausau supports a game-fish population which includes muskellunge, northern pike, walleye, bass, and panfish.

III. LAKE AND DRAINAGE BASIN CHARACTERISTICS

A. Lake Morphometry†:

1. Surface area: 1,918 acres.
2. Mean depth: 7.3 feet.
3. Maximum depth: 30 feet.
4. Volume: 13,916 acre/feet.
5. Mean hydraulic retention time: 2 days.

B. Tributary and Outlet:
(See Appendix A for flow data)

1. Tributaries -

Name	Drainage area*	Mean flow*
Wisconsin River	3,080.0 mi^2	2,792.9 cfs
Big Rib River	388.0 mi^2	316.8 cfs
Little Rib River (joins Big Rib west of Lake Wausau)	78.0 mi^2	59.3 cfs
Eau Claire River	403.0 mi^2	337.9 cfs
Minor tributaries & immediate drainage -	48.0 mi^2	38.5 cfs
Totals	3,997.0 mi^2	3,545.4 cfs

2. Outlet -

Wisconsin River	4,000.0 mi^2**	3,545.4 cfs

C. Precipitation***:

1. Year of sampling: 31.7 inches.
2. Mean annual: 28.9 inches.

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† Dept. of Natural Resources lake survey map (1973).
* Drainage areas are accurate within ±0.5%; mean daily flow are accurate within ±40%; mean monthly flows are accurate within ±35%; and normalized monthly flows are accurate within ±35%.
** Includes area of lake.
*** See Working Paper No. 1, "Survey Methods".

IV. LAKE WATER QUALITY SUMMARY

Lake Wausau was sampled three times during the open-water season of 1972 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from two stations on the lake and usually from a number of depths at each station (see map, page vii). During each visit, a single depth-integrated (near bottom to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the last visit, a five-gallon depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 15 feet at station 1 and 5 feet at station 2.

The results obtained are presented in full in Appendix B, and the data for the fall sampling period, when the lake was essentially well-mixed, are summarized below. Note, however, the Secchi disc summary is based on all values.

For differences in the various parameters at the other sampling times, refer to Appendix B.

A. Physical and chemical characteristics:

Parameter	Minimum	Mean	Median	Maximum
		FALL VALUES (11/08/72)		
Temperature (Cent.)	4.4	4.5	4.5	4.5
Dissolved oxygen (mg/l)	11.4	11.6	11.5	12.0
Conductivity (μmhos)	70	72	70	75
pH (units)	7.1	7.2	7.2	7.2
Alkalinity (mg/l)	17	19	19	20
Total P (mg/l)	0.040	0.042	0.041	0.045
Dissolved P (mg/l)	0.019	0.021	0.022	0.023
NO_2 + NO_3 (mg/l)	0.180	0.240	0.260	0.290
Ammonia (mg/l)	0.100	0.110	0.100	0.130
		ALL VALUES		
Secchi disc (inches)	18	29	30	36

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Number per ml
06/23/72	1. Melosira	271
	2. Flagellates	217
	3. Stephanodiscus	187
	4. Lyngbya	151
	5. Dinobryon	96
	6. Cyclotella	96
	Other genera	252
	Total	1,270
08/23/72	1. Flagellates	416
	2. Tribronema with Lagynion	398
	3. Lyngbya	271
	4. Cyclotella	145
	5. Dinobryon	108
	6. Navicula	108
	7. Synedra	108
	Other genera	300
	Total	1,854
11/08/72	1. Lyngbya	4,376
	2. Flagellates	271
	3. Raphidiopsis	163
	4. Navicula	99
	5. Fragilaria	90
	Other genera	227
	Total	5,226

2. Chlorophyll a -
(Because of instrumentation problems during the 1972 sampling, the following values may be in error by plus or minus 20 percent.)

Sampling Date	Station Number	Chlorophyll a (µg/l)
06/23/72	01	14.7
	02	6.5
08/23/72	01	2.0
	02	2.5
11/08/72	01	2.0
	02	2.3

C. Limiting Nutrient Study:

1. Filtered and nutrient spiked* -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.022	0.258	5.2
0.010 P	0.032	0.258	7.4
0.020 P	0.042	0.258	8.2
0.050 P	0.072	0.258	9.2
0.025 P + 5.0 N	0.047	5.258	17.8
0.050 P + 10.0 N	0.072	10.258	26.1
10.0 N	0.022	10.258	5.2

* An autoclaved and filtered assay was done initially; however, the growth response of the test alga was atypical (i.e., there was considerable variance in cell counts between the triplicate flasks). When rerun, only enough of the assay sample remained to do a filtered-only assay.

2. Discussion -

The control yield of the assay alga, Selenastrum capricornutum, indicates that the primary productivity of the lake was high at the time the sample was collected (22 of the 44 Wisconsin study lakes assayed had less control yield). Also, the increase in yields with increasing increments of orthophosphorus, and the lack of growth response when only nitrogen was added, show that Lake Wausau was phosphorus limited at that time. However, the lake data indicate nitrogen limitation at the other sampling times; N/P ratios were 7/1 in June and 9/1 in August, and nitrogen limitation would be expected.

D. Trophic Condition:

Survey data indicate that Lake Wausau is eutrophic. Of the 46 Wisconsin lakes studied, 20 had less mean total phosphorus, 25 had less mean dissolved phosphorus, and 29 had less mean inorganic nitrogen.

Only seven of the study lakes had less mean chlorophyll a, but 35 of the lakes had greater mean Secchi disc transparency. The Survey limnologists noted that the lake was very turbid and humic colored on all sampling occasions, and the relatively low chlorophyll a concentrations may have been due to light limitation.

V. NUTRIENT LOADINGS
(See Appendix C for data)

For the determination of nutrient loadings, the Wisconsin National Guard collected a monthly near-surface grab sample from each of the tributary sites indicated on the map (page vi), except for the high runoff months of April and May when two samples were collected. Sampling was begun in September, 1972, and was completed in August, 1973.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Wisconsin District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. Nutrient loadings for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated by using the means of the nutrient loads, in lbs/mi^2/year, at stations A-2, B-1, D-1, and E-1 and multiplying by the ZZ area in mi^2.

The operators of the Wausau, Brokaw, and Marathon wastewater treatment plants provided monthly effluent samples and corresponding flow data from which nutrient loads were calculated. However, the Village of Edgar and the cities of Antigo and Merrill did not participate in the Survey, and nutrient loads were estimated at 2.5 lbs P and 7.5 lbs N/capita/year.

In the following tables, the tributary loads shown are those measured minus point-source loads, if any.

* See Working Paper No. 1.

A. Waste Sources:

1. Known municipal -

Name	Pop. Served*	Treatment	Mean Flow (mgd)	Receiving Water
Merrill	9,502	Primary**	1.500	Wisconsin River
Wausau	32,806	Act. Sludge	7.618	Lake Wausau
Brokaw	312	Trickling filter	0.026	Wisconsin River
Edgar	928	Trickling filter	0.150†	Scotch Creek
Marathon	1,214	Act. Sludge	0.150†	Big Rib River
Antigo	9,005	Trickling filter	1.109†	Spring Brook

2. Known industrial† -

Name	Product	Treatment	Mean Flow (mgd)	Receiving Water
Wausau Paper Mills	paper	Fluidized bed and settling	10.130	Wisconsin River
Ward Paper Co.	paper	Filters and savealls	1.060	Wisconsin River
Merrill Mfg.	plating	Evaporation	0.063	Wisconsin River

* 1970 Census.
** Activated sludge plant under construction during Survey.
† McKersie, et al., 1970.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	lbs P/ yr	% of total
a. Tributaries (non-point load) -		
Wisconsin River	274,470	56.5
Big Rib River	37,510	7.7
Little Rib River	3,160	0.7
Eau Claire River	50,590	10.4
b. Minor tributaries & immediate drainage (non-point load) -	4,180	0.9
c. Known municipal -		
Wausau	64,860	13.3
Merrill	23,760	4.9
Brokaw	530	0.1
Marathon	1,840	0.4
Edgar	2,320	0.5
Antigo	22,510	4.6
d. Septic tanks* -	80	<0.1
e. Known industrial -		
Merrill Manufacturing	?	-
Wausau Paper Mills	?	-
Ward Paper Company	?	-
f. Direct precipitation** -	300	<0.1
Total	486,110	100.0

2. Outputs -

Lake outlet - Wisconsin River 794,170

3. Net annual P loss - 308,060 pounds

* Estimated 122 residences on lakeshore; see Working Paper No. 1.
** See Working Paper No. 1.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	lbs N/ yr	% of total
a. Tributaries (non-point load) -		
Wisconsin River	5,036,490	64.8
Big Rib River	894,430	11.5
Little Rib River	182,290	2.3
Eau Claire River	887,550	11.4
b. Minor tributaries & immediate drainage (non-point load) -	101,750	1.3
c. Known municipal -		
Wausau	494,020	6.4
Merrill	71,260	0.9
Brokaw	2,250	<0.1
Marathon	7,510	0.1
Edgar	6,960	0.1
Antigo	67,540	0.9
d. Septic tanks* -	2,870	<0.1
e. Known industrial -		
Merrill Manufacturing	?	-
Wausau Paper Mills	?	-
Ward Paper Company	?	-
f. Direct precipitation** -	18,480	0.2
Total	7,773,400	100.0

2. Outputs -

Lake outlet	9,922,230

3. Net annual N loss - 2,148,830 pounds

* Estimated 122 residences on lakeshore; see Working Paper No. 1.
** See Working Paper No. 1.

D. Mean Annual Non-point Nutrient Export by Sub-drainage Area:

Tributary	lbs P/mi^2/yr	lbs N/mi^2/yr
Wisconsin River	89	1,635
Big Rib River	97	2,308
Little Rib River	41	2,337
Eau Claire	126	2,202

E. Yearly Loading Rates:

In the following table, the existing phosphorus loading rates are compared to those proposed by Vollenweider (in press). Essentially, his "dangerous" rate is the rate at which the receiving waters would become eutrophic or remain eutrophic; his "permissible" rate is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic rate would be considered one between "dangerous" and "permissible".

	Total Phosphorus		Total Nitrogen	
Units	Total	Accumulated	Total	Accumulated
lbs/acre/yr	253.4	loss	4,053.0	loss
grams/m^2/yr	28.41	-	454.3	-

Vollenweider loading rates for phosphorus ($g/m^2/yr$) based on mean depth and mean hydraulic retention time of Lake Wausau:

"Dangerous" (eutrophic rate)	3.8
"Permissible" (oligotrophic rate)	1.9

VI. LITERATURE REVIEWED

Anonymous, 1972. Wisconsin lakes. Publ. 218-72, Dept. of Natural Resources, Madison.

McKersie, Jerome R., Robert M. Krill, William H. Doyle, and Larry L. Maltbey, 1970. Upper Wisconsin River pollution investigation survey. Dept. of Natural Resources, Madison.

Schraufnagel, Francis H., 1974. Personal communication (Lake Wausau water level control). Dept. of Natural Resources, Madison.

Vollenweider, Richard A., (in press). Input-output models. Schweiz. A. Hydrol.

VII. APPENDICES

APPENDIX A

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR WISCONSIN 9/30/74

LAKE CODE 5551 LAKE WAUSAU

TOTAL DRAINAGE AREA OF LAKE 4000.00

TRIBUTARY	SUB-DRAINAGE AREA	NORMALIZED FLOWS JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
5551A1	4000.00	2534.20	2313.80	4076.70	7712.50	5178.50	3636.00	3195.30	2424.10	3085.10	2864.80	2974.90	2534.10	3545.42
5551A2	3080.00	1900.00	1900.00	2800.00	5100.00	4100.00	3300.00	2600.00	2200.00	2600.00	2600.00	2400.00	2000.00	2792.88
555181	388.00	120.00	93.00	380.00	1000.00	490.00	390.00	190.00	180.00	310.00	240.00	270.00	140.00	316.83
5551D1	78.00	18.00	14.00	100.00	180.00	110.00	78.00	35.00	25.00	44.00	34.00	50.00	23.00	59.31
5551E1	403.00	120.00	97.00	390.00	1100.00	520.00	430.00	200.00	190.00	330.00	250.00	280.00	150.00	337.91
5551ZZ	51.00	11.00	9.00	71.00	120.00	71.00	51.00	22.00	14.00	26.00	20.00	32.00	14.00	38.45

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 4000.00
SUM OF SUB-DRAINAGE AREAS = 4000.00

TOTAL FLOW IN = 42532.00
TOTAL FLOW OUT = 42529.98

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
5551A1	9	72	6200.00	23	4100.00				
	10	72	6400.00	14	5400.00				
	11	72	6600.00						
	12	72	3200.00	10	3200.00				
	1	73	3790.00						
	2	73	2980.00	10	2900.00				
	3	73	13000.00	10	13000.00				
	4	73	9910.00	7	7130.00	20	12900.00		
	5	73	3100.00	5	19800.00	19	6960.00		
	6	73	4370.00	11	4590.00				
	7	73	2510.00	29	2150.00				
	8	73	2530.00	19	480.00				
5551A2	9	72	5600.00	23	3800.00				
	10	72	4700.00	14	3900.00				
	11	72	5000.00						
	12	72	2800.00	10	3100.00				
	1	73	2900.00						
	2	73	2600.00	10	2700.00				
	3	73	7200.00	10	4800.00				
	4	73	6400.00	7	5300.00	20	9600.00		
	5	73	9600.00	5	14000.00	19	5100.00		
	6	73	3500.00	11	3800.00				
	7	73	2200.00	29	2100.00				
	8	73	2200.00	19	2400.00				

TRIBUTARY FLOW INFORMATION FOR WISCONSIN 9/30/74

LAKE CODE 5551 LAKE WAUSAU

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
5551B1	9	72	640.00	23	260.00				
	10	72	520.00	14	350.00				
	11	72	500.00						
	12	72	210.00	10	190.00				
	1	73	330.00						
	2	73	210.00	10	180.00				
	3	73	1500.00	10	2800.00				
	4	73	1000.00	7	670.00	20	1300.00		
	5	73	1200.00	6	1300.00	19	500.00		
	6	73	350.00	11	370.00				
	7	73	160.00	29	150.00				
	8	73	140.00	17	120.00				
5551D1	9	72	64.00	23	26.00				
	10	72	54.00	14	35.00				
	11	72	50.00						
	12	72	21.00	10	19.00				
	1	73	59.00						
	2	73	35.00	10	28.00				
	3	73	390.00	10	750.00				
	4	73	195.00	7	120.00	20	240.00		
	5	73	260.00	5	410.00	19	110.00		
	6	73	68.00	11	72.00				
	7	73	28.00	29	26.00				
	8	73	20.00	19	33.00				
5551E1	9	72	680.00	23	280.00				
	10	72	550.00	14	370.00				
	11	72	530.00						
	12	72	220.00	10	200.00				
	1	73	350.00						
	2	73	220.00	10	190.00				
	3	73	1500.00	10	2800.00				
	4	73	1100.00	7	700.00	20	1300.00		
	5	73	1200.00	5	2000.00	19	510.00		
	6	73	370.00	11	380.00				
	7	73	160.00	29	150.00				
	8	73	150.00	19	260.00				
5551Z2	9	72	35.00	23	14.00				
	10	72	28.00	14	19.00				
	11	72	27.00						
	12	72	11.00	10	10.00				
	1	73	32.00						
	2	73	21.00	10	17.00				
	3	73	270.00	10	530.00				
	4	73	120.00	7	76.00	20	150.00		
	5	73	170.00	5	280.00	6	180.00	19	72.00
	6	73	44.00	11	47.00				
	7	73	17.00	29	17.00				
	8	73	12.00	19	20.00				

APPENDIX B

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 74/09/30

555101
44 53 48.0 089 37 24.0
LAKE WAUSAU
55 WISCONSIN

11EPALES
3

2111202
0018 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00630 NO2&NO3 N-TOTAL MG/L	00610 NH3-N TOTAL MG/L	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P
72/06/23	16 20	0000	19.2	7.3	36	110	7.20	27	0.160	0.120	0.059	0.045
	16 20	0015	19.2	6.6		100	7.10	27	0.160	0.140	0.060	0.044
72/08/23	11 10	0000			33	93	6.80	29	0.300	0.150	0.095	0.064
	11 10	0004	19.4			92	6.80	28	0.340	0.190	0.099	0.074
	11 10	0010	19.4	4.9		92	6.72	27	0.340	0.180	0.098	0.063
	11 10	0015	19.3	4.6		92	6.75	22	0.320	0.140	0.097	0.054
72/11/08	11 45	0000			18	75	7.20	19	0.270	0.100	0.045	0.022
	11 45	0004	4.5	11.5		75	7.20	20	0.260	0.100	0.041	0.023
	11 45	0007	4.5	11.4		70	7.10	19	0.290	0.120	0.044	0.022

DATE FROM TO	TIME OF DAY	DEPTH FEET	32217 CHLRPHYL A UG/L
72/06/23	16 20	0000	14.7J
72/08/23	11 10	0000	2.0J
72/11/08	11 45	0000	2.0J

J VALUE KNOWN TO BE IN ERROR

STORET RETRIEVAL DATE 74/09/30

555102
44 56 06.0 089 38 18.0
LAKE WAUSAU
55 WISCONSIN

11EPALES
3

2111202
0008 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00630 NO2&NO3 N-TOTAL MG/L	00610 NH3-N TOTAL MG/L	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P
72/06/23	16 40	0000	20.0	7.0	36	80	7.20	24	0.180	0.050	0.048	0.031
72/08/23	10 55	0000			26	88	6.75	19	0.360	0.090	0.073	0.032
	10 55	0004	19.5	5.8		88	6.70	18	0.330	0.070	0.072	0.034
72/11/08	12 00	0000			23	70	7.20	17	0.180	0.100	0.041	0.019
	12 00	0005	4.4	12.0		70	7.20	18	0.200	0.130	0.040	0.020

DATE FROM TO	TIME OF DAY	DEPTH FEET	32217 CHLRPHYL A UG/L
72/06/23	16 40	0000	6.5J
72/08/23	10 55	0000	2.5J
72/11/08	12 00	0000	2.3J

J VALUE KNOWN TO BE IN ERROR

APPENDIX C

TRIBUTARY and WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 74/10/02

5551A1 LS5551A1
44 53 00.0 089 38 30.0
WISCONSIN RIVER
55 15 WAUSAU
O/LAKE WAUSAU
AT ROTHSCHILD DAM 3 MI S BEL WAUSAU STP
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/09/23	10 25		0.300	1.000	0.070	0.005K	0.096
72/10/14	09 30		0.440	1.250	0.154	0.039	0.091
72/11/11	09 10		0.240	0.840	0.052	0.036	0.075
72/12/10	09 45		0.300	1.320	0.280	0.092	0.168
73/01/13	14 20		0.310	1.300	0.430	0.120	0.180
73/02/10	11 15		0.330	1.890	0.900	0.190	0.270
73/03/10	10 50		0.440	1.260	0.320	0.056	0.133
73/04/07	10 30		0.240	0.880	0.138	0.038	0.070
73/04/20	08 30		0.170	0.750	0.073	0.022	0.065
73/05/05	09 55		0.132	1.980	0.063	0.021	0.060
73/05/19	08 20		0.110	0.780	0.096	0.012	0.055
73/06/11	13 15		0.160	1.150	0.170	0.015	0.070
73/07/29	09 50		0.189	0.900	0.005K	0.025	0.090
73/08/19	14 12		0.065	0.840	0.030	0.034	0.125

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 74/10/02

5551A2 LS5551A2
44 57 30.0 089 38 00.0
WISCONSIN RIVER
55 15 WAUSAU
I/LAKE WAUSAU
ST HWY 29 BRDG IN WAUSAU ABOVE STP
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/09/23	12 42		0.140	1.000	0.041	0.005K	0.063
72/10/14	09 00		0.330		0.470	0.018	0.100
72/11/11	10 00		0.140	0.750	0.046	0.013	0.042
72/12/10	10 35		0.190	0.930	0.078	0.014	0.058
73/01/13	14 45		0.210	0.630	0.098	0.021	0.040
73/02/10	11 45		0.250	1.150	0.120	0.017	0.040
73/03/10	11 25		0.330	0.860	0.170	0.038	0.070
73/04/07	10 50		0.160	0.690	0.075	0.012	0.040
73/04/20	08 55		0.099	0.620	0.043	0.007	0.045
73/05/05	08 15		0.063	0.660	0.028	0.014	0.045
73/05/19	08 00		0.063	0.600	0.008	0.006	0.035
73/06/11	12 50		0.105	0.690	0.038	0.007	0.045
73/07/29	08 25		0.084	0.630	0.012	0.005K	0.055
73/08/19	12 30		0.083	0.610	0.037	0.015	0.050

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 74/10/02

5551A3 LS5551A3
45 00 30.0 089 37 00.0
WISCONSIN RIVER
55 7.5 MERRILL
I/LAKE WAUSAU
CO HWY W4.5 MI N WAUSAU BELOW BROKAW STP
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/09/23	09 30		0.202	1.500	0.034	0.005K	0.068
72/10/14	10 00		0.215	0.950	0.089	0.014	0.060
72/11/11	10 35		0.154	0.770	0.082	0.014	0.042
72/12/10	08 15		0.180	0.920	0.060	0.011	0.036
73/01/13	10 20		0.210	0.840	0.115	0.018	0.040
73/02/10	10 20		0.240	0.750	0.092	0.016	0.045
73/03/10	09 50		0.370	0.897	0.180	0.029	0.070
73/04/07	09 55		0.189	0.670	0.088	0.010	0.040
73/04/20	09 15		0.150	0.690	0.084	0.012	0.050
73/05/05	08 40		0.100	0.950	0.038	0.014	0.045
73/05/19	08 20		0.056	0.965	0.018	0.006	0.040
73/06/11	13 55		0.110	0.780	0.027	0.009	0.050
73/07/29	08 55		0.100	0.580	0.005K	0.005K	0.055
73/08/19	13 30		0.023	0.560	0.023	0.016	0.055

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 74/10/02

5551A4 LS5551A4
45 46 30.0 089 39 30.0
WISCONSIN RIVER
55 7.5 MERRILL
I/LAKE WAUSAU
END CO HWY WW ABOVE BROKAW STP
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/09/23	09 00		0.245	2.000	0.022	0.005K	0.069
72/10/14	10 15		0.273	0.850	0.154	0.013	0.054
72/11/11	10 25		0.132	1.050	0.033	0.013	0.040
72/12/10	08 50		0.180	0.780	0.052	0.011	0.036
73/01/13	10 00		0.200	0.660	0.115	0.016	0.040
73/02/10	10 00		0.270	1.600	0.430	0.012	0.035
73/03/10	09 35		0.336	0.850	0.210	0.031	0.070
73/04/07	09 45		0.154	0.600	0.034	0.009	0.040
73/04/20	09 20		0.100	1.700	0.072	0.009	0.050
73/05/05	08 05		0.056	0.605	0.016	0.012	0.045
73/05/19	09 30		0.058	0.690	0.030	0.007	0.040
73/06/11	14 10		0.130	0.660	0.086	0.009	0.045
73/07/29	08 45		0.150	1.470	0.005K	0.007	0.050
73/08/19	13 00		0.150	0.400	0.017	0.013	0.045

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 74/10/02

5551A5 LS5551A5
45 08 30.0 089 39 00.0
WISCONSIN RIVER
55 7.5 MERRILL
I/LAKE WAUSAU
FARM RD 3 MI S MERRILL BELOW STP
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/09/23	15	20	0.122	0.950	0.071	0.007	0.058
72/10/15	13	50	0.311	1.400	0.154	0.011	0.054
72/11/11	12	35	0.147	1.100	0.042	0.014	0.040
73/03/11	13	20	0.270	1.540	0.198	0.028	0.035
73/04/07	14	20	0.176	0.730	0.027	0.010	0.035
73/04/26	13	20	0.105	1.000	0.035	0.010	0.035
73/05/06	11	45	0.063	0.800	0.026	0.014	0.040
73/05/19	14	15	0.080	0.690	0.029	0.006	0.035
73/06/23	12	55	0.126	0.660	0.029	0.009	0.060
73/07/22	12	40	0.176	0.660	0.028	0.020	0.040
73/08/27	13	45	0.210	0.600	0.046	0.015	0.049

STORET RETRIEVAL DATE 74/10/02

555156 LS555156
45 10 30.0 089 41 00.0
WISCONSIN RIVER
55 7.5 MERRILL
T/LAKE WAUSAU
US 51 BRDG IN MERRILL ABOV STP
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/09/23	14	50	0.232	0.900	0.073	0.006	0.058
72/10/15	13	30	0.300	2.150	0.200	0.011	0.054
72/11/11	12	10	0.120	0.800	0.030	0.012	0.038
72/12/10	13	20	0.147	1.050	0.054	0.010	0.034
73/01/13	11	50	0.176	0.630	0.115	0.010	0.035
73/02/10	12	50	0.220	0.890	0.140	0.012	0.035
73/03/11	13	15	0.780		0.280	0.060	
73/04/07	13	55	0.126	0.895	0.027	0.009	0.035
73/04/26	13	10	0.080	0.560	0.025	0.011	0.035
73/05/06	11	35	0.046	1.200	0.038	0.014	0.045
73/05/19	14	00	0.046	1.760	0.044	0.006	0.035
73/06/23	12	35	0.710	1.260	0.028	0.025	0.040
73/07/22	12	25	0.160	1.700	0.080	0.020	0.045
73/08/27	13	30	0.198	2.310	0.126	0.021	0.050

STORET RETRIEVAL DATE 74/10/02

555181 LS555181
44 57 00.0 089 45 00.0
WIS RIVER
55 15 WAUSAU
T/LAKE WAUSAU
ST HWY 29 W OF WASAU BELO MARATHON STP
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/09/23	12	20	0.363	1.900	0.048	0.005K	0.120
72/10/14	09	30	0.470	0.950	0.147	0.022	0.058
72/11/11	09	30	0.690	1.400	0.035	0.025	0.050
72/12/10	08	20	0.770	0.660	0.105	0.027	0.056
73/01/13	10	00	0.750	1.030	0.160	0.040	0.075
73/02/10	09	40	0.800	1.300	0.138	0.054	0.080
73/03/10	09	35	0.640	1.540	0.450	0.098	0.190
73/04/07	09	10	0.480	0.970	0.027	0.014	0.035
73/04/20	08	15	0.620	0.660	0.035	0.017	0.045
73/05/06	12	20	0.530	0.580	0.023	0.019	0.040
73/05/19	09	55	0.240	0.540	0.014	0.012	0.035
73/06/11	16	00	0.115	0.690	0.026	0.012	0.040
73/07/29	10	20	0.034	0.480	0.005K	0.005K	0.040
73/08/17	08	30	0.037	0.822	0.042	0.020	0.045

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 74/10/02

555182 LS555182
44 56 00.0 089 50 30.0

55 15 MARATHON
T/LAKE WAUSAU
ST HWY107 BRDG ABOVE MARATHON STP
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/09/23	11 05		0.339	1.750	0.117	0.038	0.112
72/10/14	09 45		0.380	1.000	0.100	0.021	0.056
72/11/11	10 20		0.620	1.200	0.031	0.026	0.047
72/12/10	09 00		0.770	0.940	0.09R	0.023	0.045
73/01/13	10 25		0.690	0.780	0.120	0.031	0.060
73/02/10	11 10		0.750	0.600	0.105	0.037	0.060
73/03/10	09 55		0.600	1.760	0.470	0.08R	0.165
73/04/07	09 25		0.430	0.730	0.021	0.013	0.035
73/04/20	08 35		0.540	0.690	0.074	0.01R	0.045
73/05/06	12 15		0.440	0.620	0.021	0.019	0.035
73/05/19	11 00		0.176	0.580	0.017	0.011	0.030
73/06/11	14 45		0.095	0.690	0.015	0.011	0.040
73/07/29	10 25		0.011	0.560	0.013	0.00SK	0.035
73/08/17	06 30		0.013	0.780	0.054	0.009	0.030

K VALUE KNOWN TO BE LESS THAN INDICATED

30.

STORET RETRIEVAL DATE 74/10/02

5551C1 LS5551C1
44 56 00.0 089 58 00.0
SCOTCH CREEK
55 15 MARATHON
T/LAKE WAUSAU
CO RD XING 1 MI W MARATHON
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/09/23	11	20	0.364	1.500	0.081	0.005K	0.210
72/11/11	10	35	1.640	0.840	0.075	0.040	0.070
72/12/10	09	50	1.940	1.050	0.680	0.037	0.096
73/01/13	10	40	1.720	1.400	0.500	0.060	0.105
73/02/10	10	05	1.260	1.200	0.520	0.063	0.115
73/03/10	10	05	0.720	2.400	0.640	0.115	0.220
73/04/07	09	40	0.730	0.880	0.033	0.025	0.060
73/04/20	09	45	1.420	2.700	0.110	0.035	0.070
73/05/06	12	05	1.360	0.645	0.034	0.032	0.060
73/05/19	12	15	0.860	0.720	0.019	0.038	0.075
73/06/11	15	10	0.810	1.100	0.086	0.060	0.115
73/07/29	10	50	0.026	1.200	0.021	0.050	0.220
73/08/17	07	00	0.020	0.440	0.130	0.086	0.575

K VALUE KNOWN TO BE LESS
THAN INDICATED

STORET RETRIEVAL DATE 74/10/02

5551C2 LS5551C2
44 55 00.0 089 57 00.0
SCOTCH CREEK
55 15 MARATHON
T/LAKE WAUSAU
CO RD XING .75 MI E EDGAR BELOW STP
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/09/23	11 35		0.580	1.700	0.240	0.220	0.330
72/10/14	10 15		0.912	1.700	0.260	0.148	0.210
72/11/11	10 50		1.140	0.880	0.060	0.067	0.105
72/12/10	10 25		2.100	3.000	1.600	0.510	0.670
73/01/13	11 05		1.900	3.100	1.340	0.292	0.390
73/02/10	10 30		1.760	4.000	2.200	0.480	0.675
73/03/10	10 10		0.580	1.900	0.620	0.126	0.210
73/04/07	10 00		0.420	0.840	0.049	0.027	0.060
73/04/20	13 25		0.970	3.180	0.231	0.050	0.080
73/05/06	11 40		0.860	0.690	0.084	0.052	0.075
73/05/19	10 30		0.560	1.260	0.370	0.140	0.220
73/06/11	13 25		0.890	1.500	0.310	0.273	0.375
73/07/29	10 45		0.580	3.780		0.840	0.960
73/08/17	07 30		1.280	2.600	1.470	1.160	1.400

STORET RETRIEVAL DATE 74/10/02

5551C3 LS5551C3
44 55 00.0 089 58 00.0
SCOTCH CREEK
55 15 MARATHON
T/LAKE WAUSAU
CO HWY H BRDG IN EDGAR ABOVE STP
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/09/23	11 40		0.206	1.300	0.132	0.056	0.138
72/10/14	10 25		0.600	0.800	0.084	0.027	0.056
72/11/11	11 00		0.950	0.890	0.022	0.035	0.063
72/12/10	10 35		2.000	0.650	0.075	0.025	0.036
73/01/13	11 20		1.640	1.000	0.090	0.050	0.125
73/02/10	10 45		1.860	1.200	0.092	0.040	0.095
73/03/10	10 30		0.550	1.890	0.630	0.120	0.200
73/04/07	10 10		0.340	1.900	0.037	0.019	0.055
73/04/20	09 45		0.830	0.580	0.040	0.022	0.040
73/05/06	11 30		0.760	0.560	0.028	0.023	0.035
73/05/19	10 35		0.315	1.260	0.126	0.028	0.050
73/06/11	15 30		0.180	0.940	0.160	0.066	0.110
73/07/29	10 30		0.069	0.680		0.056	0.105
73/08/17	08 00		0.230	3.100	1.010	0.430	0.640

STORET RETRIEVAL DATE 74/10/02

555101 LS555101
44 57 30.0 089 41 45.0
LITTLE RIB RIVER
55 15 WAUSAU
T/LAKE WAUSAU
ST HWY 29 BRDG AT 48TH 2 MIW OF WAUSAU
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/09/23	10 45		0.515	0.750	0.094	0.019	0.062
72/10/14	10 50		0.810	0.650	0.063	0.013	0.029
72/11/11	10 15		1.430	0.500	0.019	0.013	0.029
72/12/10	10 50		1.620	0.100K	0.030	0.010	0.016
73/01/13	11 05		1.620	0.400	0.058	0.015	0.020
73/02/10	13 50		1.640	0.340	0.040	0.015	0.025
73/03/10	11 20		0.950	1.320	0.350	0.049	0.110
73/04/07	11 05		0.990	0.700	0.034	0.010	0.030
73/04/20	09 20		1.300	0.690	0.031	0.010	0.030
73/05/05	09 30		1.220	0.380	0.009	0.014	0.030
73/05/19	11 40		0.690	0.360	0.015	0.007	0.015
73/06/11	14 30		0.660	0.560	0.042	0.012	0.025
73/07/29	10 10		0.600	0.370	0.017	0.006	0.025
73/08/19	14 35		0.540	0.140	0.016	0.009	0.020

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 74/10/02

5551E1 LS5551E1
44 56 00.0 089 34 30.0
EAU CLAIRE RIVER
55 15 WAUSAU
T/LAKE WAUSAU
CO RD BRDG 1 MI NE SCHOFIELD
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/09/[illegible]3	10 00		0.320	1.070	0.378	0.061	0.110
72/10/14	09 45		0.640	0.800	0.058	0.052	0.084
72/11/11	09 30		0.690	0.870	0.021	0.052	0.078
72/12/10	09 30		1.560	1.175	0.126	0.083	0.139
73/01/13	14 00		1.100	0.830	0.240	0.147	0.180
73/02/10	11 00		1.220	0.975	0.154	0.130	0.165
73/03/10	10 30		0.550	1.200	0.290	0.063	0.125
73/04/07	10 15		0.450	0.630	0.018	0.027	0.050
73/04/20	08 40		0.420	0.600	0.026	0.033	0.060
73/05/05	10 20		0.270	0.720	0.038	0.032	0.055
73/05/19	08 50		0.450	0.480	0.009	0.024	0.045
73/06/11	13 30		0.270	0.780	0.026	0.030	0.075
73/07/29	09 15		0.330	0.520	0.035	0.147	0.190
73/08/19	14 00		0.530	0.350	0.017	0.078	0.145

STORET RETRIEVAL DATE 74/09/30

555151 A5555151 P032806
44 56 30.0 089 37 30.0
CITY OF WAUSAU
55 15 WAUSAU
T/LAKE WAUSAU
WISCONSIN RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/01/31	00 00								
CP(T)-			3.600	17.800	3.950	0.180	0.280	7.000	7.220
73/02/01	24 00								
73/02/28	00 00								
CP(T)-			3.400	19.900	4.400	1.050	2.000	6.960	6.570
73/02/28	24 00								
73/04/30	00 00								
CP(T)-			3.700	18.000	5.000	0.800	2.100	8.460	9.400
73/04/30	24 00								
73/05/31	00 00								
CP(T)-			2.570	16.800	6.450	2.270	4.300	10.300	10.300
73/05/31	24 00								
73/07/01	00 00								
CP(T)-			6.000	32.000	18.900	0.750	1.550	5.980	7.960
73/07/01	24 00								
73/07/31	00 00								
CP(T)-			3.200	15.400	5.400	1.850	3.205	7.040	7.020
73/07/31	24 00								
73/08/31	00 00								
CP(T)-			5.600	17.600		0.132	7.600	7.700	6.900
73/08/31	24 00								
73/09/30	00 00								
CP(T)-			9.100	2.700	0.270	0.270	0.760	5.400	6.580
73/09/30	24 00								
73/10/31	00 00								
CP(T)-			3.570	11.500	2.600	0.260	1.650	7.020	6.610
73/10/31	24 00								

STORET RETRIEVAL DATE 74/09/30

555152 TF555152 P000312
45 01 30.0 089 37 00.0
VLG OF BROKAW
55 7.5 MERRILL
T/LAKE WAUSAU
WISCONSIN RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 *PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
72/12/26	08 00								
CP(T)-			14.200	22.000	12.000	6.200	7.500	0.029	0.026
72/12/26	16 00								
73/01/25	08 00								
CP(T)-			4.500	23.000	16.000	5.700	6.500	0.024	0.027
73/01/25	16 00								
73/02/25	08 00								
CP(T)-			7.700	17.000	10.000	6.300		0.026	0.025
73/02/25	16 00								
73/03/30	08 00								
CP(T)-			8.400	18.900	8.500	6.050	6.500	0.027	0.032
73/03/30	16 00								
73/04/30	08 00								
CP(T)-			11.500	14.700	8.300	5.500	6.200	0.023	0.029
73/04/30	16 00								
73/05/28	11 00								
CP(T)-			18.000	8.150	5.000	5.300	6.300	0.027	0.027
73/05/28	16 00								
73/06/28	11 00								
CP(T)-			13.200	15.400	8.900	6.700	7.500	0.025	0.024
73/06/28	16 00								
73/07/30	11 00								
CP(T)-			11.200	7.200	4.500	4.700	6.000	0.034	0.028
73/07/30	16 00								
73/08/28	11 00								
CP(T)-				13.800	4.920	4.600	5.770	0.028	0.028
73/08/28	16 00								
73/09/27	11 00								
CP(T)-			10.200	15.400	7.900	6.000	6.500	0.025	0.026
73/09/27	16 00								
73/10/26	11 00								
CP(T)-			14.000	18.000	9.790	7.000	7.600	0.017	0.021
73/10/26	16 00								
73/11/29	11 00								
CP(T)-			2.300	35.000	22.000	6.500	7.900	0.013	0.020
73/11/29	16 00								

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STORET RETRIEVAL DATE 74/09/30

555152 TF555152 P000312
45 01 30.0 089 37 00.0
VLG OF BROKAW
55 7.5 MERRILL
T/LAKE WAUSAU
WISCONSIN RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/12/27 CP(T)- 73/12/27	11 00 16 00		12.400	35.000	18.000	6.900	7.900	0.019	0.022

STORET RETRIEVAL DATE 74/09/30

555154 AS555154 P001214
44 56 00.0 089 51 00.0
CITY OF MARATHON
55 15 MARATHON
T/LAKE WAUSAU
RIB RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/01/03	11	30	4.400	8.850	1.370	1.790	2.900	0.120	0.100
73/02/06	11	00							
CP(T)-			4.400	22.000	12.000	6.100	7.800	0.090	0.093
73/02/06	16	00							
73/04/05	10	00	3.700	10.500	4.100	1.735	3.000	0.123	0.100
73/05/16	10	00	5.900	12.600	3.550	2.700	3.400	0.136	0.150
73/06/10	09	00							
CP(T)-			14.000	0.700	0.390	3.400	3.700	0.140	0.145
73/06/11	09	00							
73/07/10	11	00	18.200	6.300	3.900	6.550	7.300	0.092	0.095
74/01/14	08	30							
CP(T)-			16.000	16.500	10.500	6.900	8.400	0.080	0.078
74/01/15	08	30							
74/02/05	08	30							
CP(T)-			23.000	13.000	6.200	8.800	10.500	0.080	0.083
74/02/06	08	30							
74/02/26	09	30							
CP(T)-			24.000	18.000	8.000	9.300	10.500	0.067	0.070
74/02/27	08	30							
74/03/19	08	30							
CP(T)-			12.600	10.000	6.600	5.300	7.400	0.090	0.090
74/03/20	08	30							
74/04/11	08	30							
CP(T)-			10.100	5.100	3.300	2.500	3.600	0.155	0.163
74/04/12	08	30							
74/04/29	08	30							
CP(T)-			14.000	11.000	4.900	4.400	5.900	0.100	0.150
74/04/30	09	00							
74/05/19	08	30							
CP(T)-			11.000	18.000	10.000	5.200	6.000	0.091	0.089
74/05/20	08	30							